

linux staff -- how to fast set up a preferred workable ubuntu environment

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this document records general steps for linux basic personal environment setups whenever and wherever you want to quickly install a ubuntu-linux OS and development env. with following requirements

01. (root) fast install and setup ready for project development (done)

02. with Chinese language input method (done) (done)

这个是中文测试

03. with pycharm and clion (done)(done)

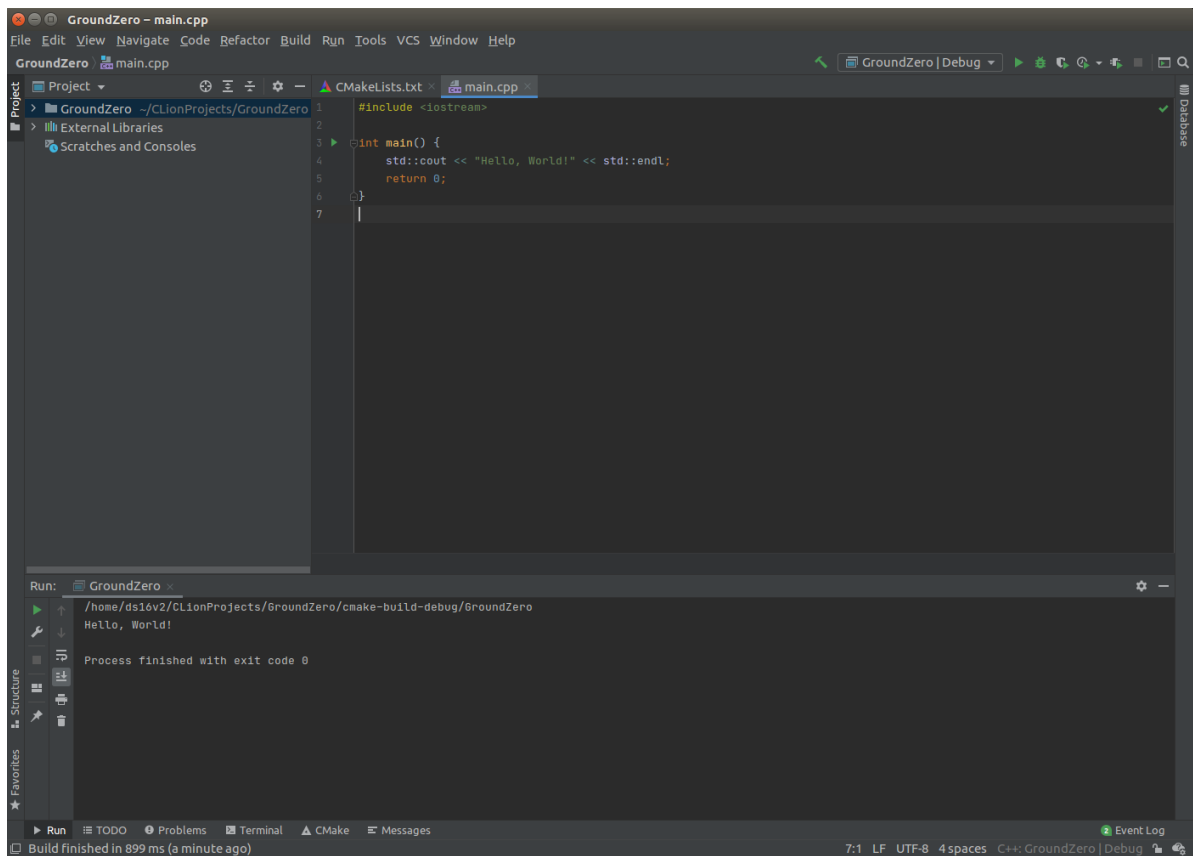
pycharm

check python interpreter:

```
Terminal: Local +
(venv2) root@ds16v2:/home/ds16v2/PythonEnvs/GroundThirdPy# whereis python
python: /usr/bin/python /usr/bin/python3.5 /usr/bin/python3.5-config /usr/bin/python3.5m /usr/bin/python2.7 /usr
/bin/python3.5m-config /usr/bin/python2.7-config /usr/lib/python3.5 /usr/lib/python2.7 /etc/python /etc/python3.
5 /etc/python2.7 /usr/local/lib/python3.5 /usr/local/lib/python2.7 /usr/include/python3.5 /usr/include/python3.5
m /usr/include/python2.7 /usr/share/python /home/ds16v2/PythonEnvs/GroundThirdPy/venv2/bin/python /home/ds16v2/P
ythonEnvs/GroundThirdPy/venv2/bin/python3.5 /usr/share/man/man1/python.1.gz
(venv2) root@ds16v2:/home/ds16v2/PythonEnvs/GroundThirdPy# which python
/home/ds16v2/PythonEnvs/GroundThirdPy/venv2/bin/python
(venv2) root@ds16v2:/home/ds16v2/PythonEnvs/GroundThirdPy#
(venv2) root@ds16v2:/home/ds16v2/PythonEnvs/GroundThirdPy# whereis python3
python3: /usr/bin/python3.5 /usr/bin/python3.5-config /usr/bin/python3.5m /usr/bin/python3 /usr/bin/python3.5m-c
onfig /usr/lib/python3.5 /usr/lib/python3 /etc/python3.5 /etc/python3 /usr/local/lib/python3.5 /usr/include/pyth
on3.5 /usr/include/python3.5m /usr/share/python3 /home/ds16v2/PythonEnvs/GroundThirdPy/venv2/bin/python3.5 /home
/ds16v2/PythonEnvs/GroundThirdPy/venv2/bin/python3 /usr/share/man/man1/python3.1.gz
(venv2) root@ds16v2:/home/ds16v2/PythonEnvs/GroundThirdPy#
(venv2) root@ds16v2:/home/ds16v2/PythonEnvs/GroundThirdPy# which python3
/home/ds16v2/PythonEnvs/GroundThirdPy/venv2/bin/python3
(venv2) root@ds16v2:/home/ds16v2/PythonEnvs/GroundThirdPy#

(venv2) root@ds16v2:/home/ds16v2/PythonEnvs/GroundThirdPy# cd
(venv2) root@ds16v2:/home/ds16v2/PythonEnvs/GroundThirdPy# ll
ls -l
-rwxr-xr-x 1 root root 264M 14 19:51 dh_pypp -> ../share/dh-python/dh_pypp
-rwxr-xr-x 1 root root 1056 11月 24 2017 dh_python2*
-rwxr-xr-x 1 root root 294M 14 19:51 dh_python3 -> ../share/dh-python/dh_python3*
-rwxr-xr-x 1 root root 233M 2 04:47 pdb2.7 -> ../lib/python2.7/pdb.py*
-rwxr-xr-x 1 root root 231M 27 02:49 pdb3.5 -> ../lib/python3.5/pdb.py*
-rwxr-xr-x 1 root root 314M 14 19:51 py3versions -> ../share/python3/py3versions.py*
-rwxr-xr-x 1 root root 264M 14 19:51 pybuild -> ../share/dh-python/pybuild
-rwxr-xr-x 1 root root 94M 14 19:51 python -> python2.7*
-rwxr-xr-x 1 root root 94M 14 19:51 python2 -> python2.7*
-rwxr-xr-x 1 root root 3492024 3月 2 04:47 python2.7*
-rwxr-xr-x 1 root root 333M 2 04:47 python2.7-config -> x86_64-linux-gnu-python2.7-config*
-rwxr-xr-x 1 root root 1611M 24 2017 python2-config -> python2.7-config
-rwxr-xr-x 1 root root 94M 14 19:51 python3 -> python3.5*
-rwxr-xr-x 2 root root 4456208 1月 27 02:40 python3.5*
-rwxr-xr-x 1 root root 331M 27 02:40 python3.5-config -> x86_64-linux-gnu-python3.5-config*
-rwxr-xr-x 2 root root 4456208 1月 27 02:40 python3.5m*
-rwxr-xr-x 1 root root 341M 27 02:40 python3.5m-config -> x86_64-linux-gnu-python3.5m-config*
-rwxr-xr-x 1 root root 163M 23 2016 python3-config -> python3.5-config
-rwxr-xr-x 1 root root 104M 14 19:51 python3m -> python3.5m*
-rwxr-xr-x 1 root root 173M 23 2016 python3m-config -> python3.5m-config
-rwxr-xr-x 1 root root 1611M 24 2017 python-config -> python2.7-config
-rwxr-xr-x 1 root root 294M 14 19:51 pyversions -> ../share/python/pyversions.py*
-rwxr-xr-x 1 root root 2909 3月 2 04:41 x86_64-linux-gnu-python2.7-config*
-rwxr-xr-x 1 root root 341M 27 02:40 x86_64-linux-gnu-python3.5-config -> x86_64-linux-gnu-python3.
5m-config*
-rwxr-xr-x 1 root root 3189 1月 27 02:40 x86_64-linux-gnu-python3.5m-config*
-rwxr-xr-x 1 root root 333M 23 2016 x86_64-linux-gnu-python3-config -> x86_64-linux-gnu-python3.5-
config*
-rwxr-xr-x 1 root root 343M 23 2016 x86_64-linux-gnu-python3m-config -> x86_64-linux-gnu-python3.5
m-config*
-rwxr-xr-x 1 root root 3311M 24 2017 x86_64-linux-gnu-python-config -> x86_64-linux-gnu-python2.7-c
onfig*
(venv2) root@ds16v2:/usr/bin#
```

clion



create pycharm or clion desktop entry

1. enter IDE
2. tools
3. create desktop entry

04. with redmine setup ready (done)(done)

```
jin.li@aitronx.com
jin.li
lijin911
```

05. with gitlab setup ready (add secure key and 如何通过拷贝的仓库建立远程链接<仓库中包含软连接>) (done) (done)

1. China repository

```
http://120.78.195.113/
lijingitlab911
```

2. US repository

```
http://35.247.3.214/tauristar/TauristarPlatformSimulation  
lijingl911
```

3. add ssh key

注：如果使用了 `sudo` 或者是在 `root` 用户下生成的 `ssh-key`，系统会生成一个文件路径 `Created directory '/root/.ssh'.`，这样不好，尽量在用户模式下生成 `ssh-key`，此模式下 `ssh-key` 的默认目录在 `/home/[usr]/.ssh`，对应的 `id_rsa`, `id_rsa.pub` 都在这个目录下，所以在做修改时要参考这个目录。

```
root@ds16v2:/home/ds16v2/Software/pycharm-community-2020.3.3/bin# cd  
root@ds16v2:~# cd ~/.ssh  
bash: cd: /root/.ssh: No such file or directory  
  
# 需要按三次空格  
root@ds16v2:~# ssh-keygen -t rsa -C "jin.li@aitronx.com"  
Generating public/private rsa key pair.  
Enter file in which to save the key (/root/.ssh/id_rsa):  
Created directory '/root/.ssh'.  
Enter passphrase (empty for no passphrase):  
Enter same passphrase again:  
Your identification has been saved in /root/.ssh/id_rsa.  
Your public key has been saved in /root/.ssh/id_rsa.pub.  
The key fingerprint is:  
SHA256:VJ2akpAw4ja2CpaBr4Y2wbnb4P0Q1H0KKA2BcUITAIA jin.li@aitronx.com  
The key's randomart image is:  
+---[RSA 2048]-----+  
|%++ 0. . . . |  
|E=. . . 0 . 0 |  
|+.= . . . 0 |  
|.==0 . 0 0 |  
|oBoo . S. |  
|*== + |  
|*X.. |  
|=.* |  
| ooo |  
+----[SHA256]-----+  
  
root@ds16v2:~# cat ~/.ssh/id_rsa.pub  
ssh-rsa  
AAAAB3NzaC1yc2EAAAADAQABAAQDA0Fh0soZBhVfSTBwAYjLZShmUfkuJGxJ97AED0oK8Asx3u  
EsLvnd0tcuQH7YGoQfJi+BLoa7isLLFYCbDt4ygTQEeqQ0UMSnR  
  
root@ds16v2:~# ls -a ~/.ssh  
. .. id_rsa id_rsa.pub known_hosts
```

注：因为是在 `root` 下生成的 `ssh`，`git clone` 的时候需要切换到 `root` 用户。

问题：使用 sudo 命令生成 ssh key，只能使用 root 用户 git clone

找到方法使之在不重新使用“用户”模式生成 ssh key 的情况下, 可以在 用户模式 git clone 远程仓库

1. problem reproduce: 见上，是在 root 用户中生成的 `.ssh`
2. 查看 `.ssh`，发现不同用户中的文件内容是不同的

```
ds16v2@ds16v2:~$ ls -a ~/.ssh
.  ..  known_hosts

ds16v2@ds16v2:~$ sudo su
[sudo] password for ds16v2:
root@ds16v2:/home/ds16v2# ls -a ~/.ssh
.  ..  id_rsa  id_rsa.pub  known_hosts
```

3. 查看 `.ssh` 中文件详细信息，可以看到因为是在 `root` 下生成的 `.ssh`，所以权限都是 `root`，路径在 `~/.ssh`

```
root@ds16v2:/home/ds16v2# ls -l ~/.ssh
total 12
-rw----- 1 root root 1675 4月 19 10:44 id_rsa
-rw-r--r-- 1 root root 400 4月 19 10:44 id_rsa.pub
-rw-r--r-- 1 root root 666 4月 19 11:19 known_hosts
```

4. 需要将 `~/.ssh` 文件夹拷贝到 `home/[usr]/` 下

```
# 1. 拷贝 .ssh 到 /home/ds16v2/ 下
root@ds16v2:~# cp -r .ssh /home/ds16v2/

# 2. 查看 /home/ds16v2/.ssh 下的文件
root@ds16v2:/home/ds16v2/.ssh# ls -al
total 20
drwx----- 2 ds16v2 ds16v2 4096 4月 19 13:03 .
drwxr-xr-x 31 ds16v2 ds16v2 4096 4月 19 10:56 ..
-rw----- 1 root root 1675 4月 19 13:03 id_rsa
-rw-r--r-- 1 root root 400 4月 19 13:03 id_rsa.pub
-rw-r--r-- 1 ds16v2 ds16v2 666 4月 19 13:03 known_hosts

# 3. 因为一些原因，没有将 user:group 改完全，需要将 id_rsa, id_rsa.pub 改成 ds16v2:ds16v2
root@ds16v2:/home/ds16v2/.ssh# chown ds16v2:ds16v2 id_rsa id_rsa.pub

# 4. 继续查看
root@ds16v2:/home/ds16v2/.ssh# ll -al
total 20
drwx----- 2 ds16v2 ds16v2 4096 4月 19 13:03 ./
drwxr-xr-x 31 ds16v2 ds16v2 4096 4月 19 10:56 ../
-rw----- 1 ds16v2 ds16v2 1675 4月 19 13:03 id_rsa
-rw-r--r-- 1 ds16v2 ds16v2 400 4月 19 13:03 id_rsa.pub
-rw-r--r-- 1 ds16v2 ds16v2 666 4月 19 13:03 known_hosts

# 对比 2 现在可以看到 id_rsa, id_rsa.pub 文件了
root@ds16v2:/home/ds16v2/.ssh# ls -a ~/.ssh
```

```
. .. id_rsa id_rsa.pub known_hosts
```

小技巧：可以换系统后可以不用再 git clone，可以直接拷贝已有的本地仓库，然后 git status + git pull，前提是此系统已经关联了远程仓库：

比如：TauristarPlatformSimulation 和 TDA2XBSP，直接从 Ubuntu-ds16 系统中拷贝，然后做 git 操作

```
ds16v2@ds16v2: ~/Work/TauristarPlatformSimulation
ds16v2@ds16v2:~/Work/TDA2XBSP_bk$ git status
On branch master
Your branch is up-to-date with 'origin/master'.
nothing to commit, working directory clean
ds16v2@ds16v2:~/Work/TDA2XBSP_bk$ git status
On branch master
Your branch is up-to-date with 'origin/master'.
nothing to commit, working directory clean
ds16v2@ds16v2:~/Work/TDA2XBSP_bk$ git pull
remote: Counting objects: 22, done.
remote: Compressing objects: 100% (22/22), done.
remote: Total 22 (delta 19), reused 0 (delta 0)
Unpacking objects: 100% (22/22), done.
From ssh://120.78.195.113:23/xiqing/TDA2XBSP
 816b1da..97dc210 master -> origin/master
Updating 816b1da..97dc210
Fast-forward
 .../APA_ParkSpaceGridmap/APA_ParkSpaceGridmap.cpp | 67 ++++++++-----
 .../APA_ParkSpaceGridmap/APA_ParkSpaceGridmap.h   |  1 +
 bvs/DE2318_IC421/APA/param/alg_param.cpp          |  2 +-
 bvs/DE2318_IC421/APA/param/car_param.cpp          |  1 +
 bvs/DE2318_IC421/APA/param/car_param.h            |  1 +
 bvs/DE2318_IC421/apa.cpp                          | 38 +++++-----
 bvs/DE2318_IC421/bvs_win.cpp                      |  2 +-
 7 files changed, 63 insertions(+), 49 deletions(-)
ds16v2@ds16v2:~/Work/TDA2XBSP_bk$ git rev-parse HEADJ
HEADJ
fatal: ambiguous argument 'HEADJ': unknown revision or path not in the working tree.
Use '--' to separate paths from revisions, like this:
'git <command> [<revision>...] -- [<file>...]'
ds16v2@ds16v2:~/Work/TDA2XBSP_bk$ git rev-parse HEAD
97dc2102ecc5fb114f5e2a78f07f9f7431610f71
ds16v2@ds16v2:~/Work/TDA2XBSP_bk$ cd ..
ds16v2@ds16v2:~/Work$ ls
TauristarPlatform  TauristarPlatformRecipe  TauristarPlatformThirdpa
```

```

ds16v2@ds16v2: ~/Work/TauristarPlatformSimulation
add      Add file contents to the index
mv       Move or rename a file, a directory, or a symlink
reset    Reset current HEAD to the specified state
rm       Remove files from the working tree and from the index

examine the history and state (see also: git help revisions)
bisect   Use binary search to find the commit that introduced a bug
grep     Print lines matching a pattern
log      Show commit logs
show     Show various types of objects
status   Show the working tree status

grow, mark and tweak your common history
branch   List, create, or delete branches
checkout Switch branches or restore working tree files
commit   Record changes to the repository
diff     Show changes between commits, commit and working tree, etc
merge    Join two or more development histories together
rebase   Forward-port local commits to the updated upstream head
tag      Create, list, delete or verify a tag object signed with GPG

collaborate (see also: git help workflows)
fetch    Download objects and refs from another repository
pull     Fetch from and integrate with another repository or a local br
anch
push     Update remote refs along with associated objects

'git help -a' and 'git help -g' list available subcommands and some
concept guides. See 'git help <command>' or 'git help <concept>'
to read about a specific subcommand or concept.
ds16v2@ds16v2:~/Work/TauristarPlatformSimulation$ git status
On branch master
Your branch is up-to-date with 'origin/master'.
nothing to commit, working directory clean
ds16v2@ds16v2:~/Work/TauristarPlatformSimulation$ git pull
The authenticity of host '[35.247.3.214]:23 ([35.247.3.214]:23)' can't be es
tablished.
ECDSA key fingerprint is SHA256:jJAam+DZfNX1hPfQTQFjvBgZ+GVNGcTj5TuHHTlrxfg.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '[35.247.3.214]:23' (ECDSA) to the list of known
hosts.
Already up-to-date.
ds16v2@ds16v2:~/Work/TauristarPlatformSimulation$ git pull
Already up-to-date.
ds16v2@ds16v2:~/Work/TauristarPlatformSimulation$

```

06. (VIP) with python pip installed and upgrade ready (done)(done) -- link to 14

how to upgrade python3 in ubuntu 16.04.

how to create a python virtual environment. (done)(new)

```

ds16v2@ds16v2:~$ pip3 -V
pip 8.1.1 from /usr/lib/python3/dist-packages (python 3.5)
ds16v2@ds16v2:~$ python3
Python 3.5.2 (default, Jan 26 2021, 13:30:48)
[GCC 5.4.0 20160609] on linux

```

```

Type "help", "copyright", "credits" or "license" for more information.
>>> import numpy
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
ImportError: No module named 'numpy'
>>> exit()
ds16v2@ds16v2:~$ pip3 install numpy -i https://pypi.douban.com/simple/
Collecting numpy
  Downloading
https://pypi.doubanio.com/packages/82/a8/1e0f86ae3f13f7ce260e9f782764c16559917f24
382c74edfb52149897de/numpy-1.20.2.zip (7.8MB)
100% |████████████████████████████████████████| 7.8MB 218kB/s
Complete output from command python setup.py egg_info:
Traceback (most recent call last):
  File "<string>", line 1, in <module>
  File "/tmp/pip-build-q8v0ukuj/numpy/setup.py", line 30, in <module>
    raise RuntimeError("Python version >= 3.7 required.")
RuntimeError: Python version >= 3.7 required.

-----
Command "python setup.py egg_info" failed with error code 1 in /tmp/pip-build-
q8v0ukuj/numpy/
You are using pip version 8.1.1, however version 21.0.1 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
ds16v2@ds16v2:~$ pip3 install --upgrade pip
Collecting pip
  Downloading
https://files.pythonhosted.org/packages/fe/ef/60d7ba03b5c442309ef42e7d69959f73aac
ccd0d86008362a681c4698e83/pip-21.0.1-py3-none-any.whl (1.5MB)
51% |████████████████████████████████████████| 798kB 2.8kB/s eta 0:04:28Exception:
Traceback (most recent call last):
  File "/usr/share/python-wheels/urllib3-1.13.1-py2.py3-none-
any.whl/urllib3/response.py", line 226, in _error_catcher
    yield
  File "/usr/share/python-wheels/urllib3-1.13.1-py2.py3-none-
any.whl/urllib3/response.py", line 301, in read
    data = self._fp.read(amt)
  File "/usr/share/python-wheels/CacheControl-0.11.5-py2.py3-none-
any.whl/cachecontrol/filewrapper.py", line 49, in read
    data = self.__fp.read(amt)
  File "/usr/lib/python3.5/http/client.py", line 462, in read
    n = self.readinto(b)
  File "/usr/lib/python3.5/http/client.py", line 502, in readinto
    n = self.fp.readinto(b)
  File "/usr/lib/python3.5/socket.py", line 575, in readinto
    return self._sock.recv_into(b)
  File "/usr/lib/python3.5/ssl.py", line 929, in recv_into
    return self.read(nbytes, buffer)
  File "/usr/lib/python3.5/ssl.py", line 791, in read
    return self._sslobj.read(len, buffer)
  File "/usr/lib/python3.5/ssl.py", line 575, in read
    v = self._sslobj.read(len, buffer)
socket.timeout: The read operation timed out

During handling of the above exception, another exception occurred:

Traceback (most recent call last):
  File "/usr/lib/python3/dist-packages/pip/basecommand.py", line 209, in main

```



```

        status = self.run(options, args)
    File "/usr/lib/python3/dist-packages/pip/commands/install.py", line 328, in
run
        wb.build(autobuilding=True)
    File "/usr/lib/python3/dist-packages/pip/wheel.py", line 748, in build
        self.requirement_set.prepare_files(self.finder)
    File "/usr/lib/python3/dist-packages/pip/req/req_set.py", line 360, in
prepare_files
        ignore_dependencies=self.ignore_dependencies))
    File "/usr/lib/python3/dist-packages/pip/req/req_set.py", line 577, in
_prepare_file
        session=self.session, hashes=hashes)
    File "/usr/lib/python3/dist-packages/pip/download.py", line 810, in
unpack_url
        hashes=hashes
    File "/usr/lib/python3/dist-packages/pip/download.py", line 649, in
unpack_http_url
        hashes)
    File "/usr/lib/python3/dist-packages/pip/download.py", line 871, in
_download_http_url
        _download_url(resp, link, content_file, hashes)
    File "/usr/lib/python3/dist-packages/pip/download.py", line 595, in
_download_url
        hashes.check_against_chunks(downloaded_chunks)
    File "/usr/lib/python3/dist-packages/pip/utils/hashes.py", line 46, in
check_against_chunks
        for chunk in chunks:
    File "/usr/lib/python3/dist-packages/pip/download.py", line 563, in
written_chunks
        for chunk in chunks:
    File "/usr/lib/python3/dist-packages/pip/utils/ui.py", line 139, in iter
        for x in it:
    File "/usr/lib/python3/dist-packages/pip/download.py", line 552, in
resp_read
        decode_content=False):
    File "/usr/share/python-wheels/urllib3-1.13.1-py2.py3-none-
any.whl/urllib3/response.py", line 344, in stream
        data = self.read(amt=amt, decode_content=decode_content)
    File "/usr/share/python-wheels/urllib3-1.13.1-py2.py3-none-
any.whl/urllib3/response.py", line 311, in read
        flush_decoder = True
    File "/usr/lib/python3.5/contextlib.py", line 77, in __exit__
        self.gen.throw(type, value, traceback)
    File "/usr/share/python-wheels/urllib3-1.13.1-py2.py3-none-
any.whl/urllib3/response.py", line 231, in _error_catcher
        raise ReadTimeoutError(self._pool, None, 'Read timed out.')
requests.packages.urllib3.exceptions.ReadTimeoutError:
HTTPConnectionPool(host='files.pythonhosted.org', port=443): Read timed out.
You are using pip version 8.1.1, however version 21.0.1 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
ds16v2@ds16v2:~$

```

07. setup preference for terminator (done)(done)

use the original default preference for terminator. (done)

08. setup ready for pycharm and clion Chinese input environment (done)(done)

in ../bin/clion.sh or ../bin/pycharm.sh

add:

```
# -----  
# Configure fcitx.  
# -----  
export XMODIFIERS="@im=fcitx"  
export GTK_IM_MODULE="fcitx"  
export QT_IM_MODULE="fcitx"
```

09. install nvidia driver (done)(done)

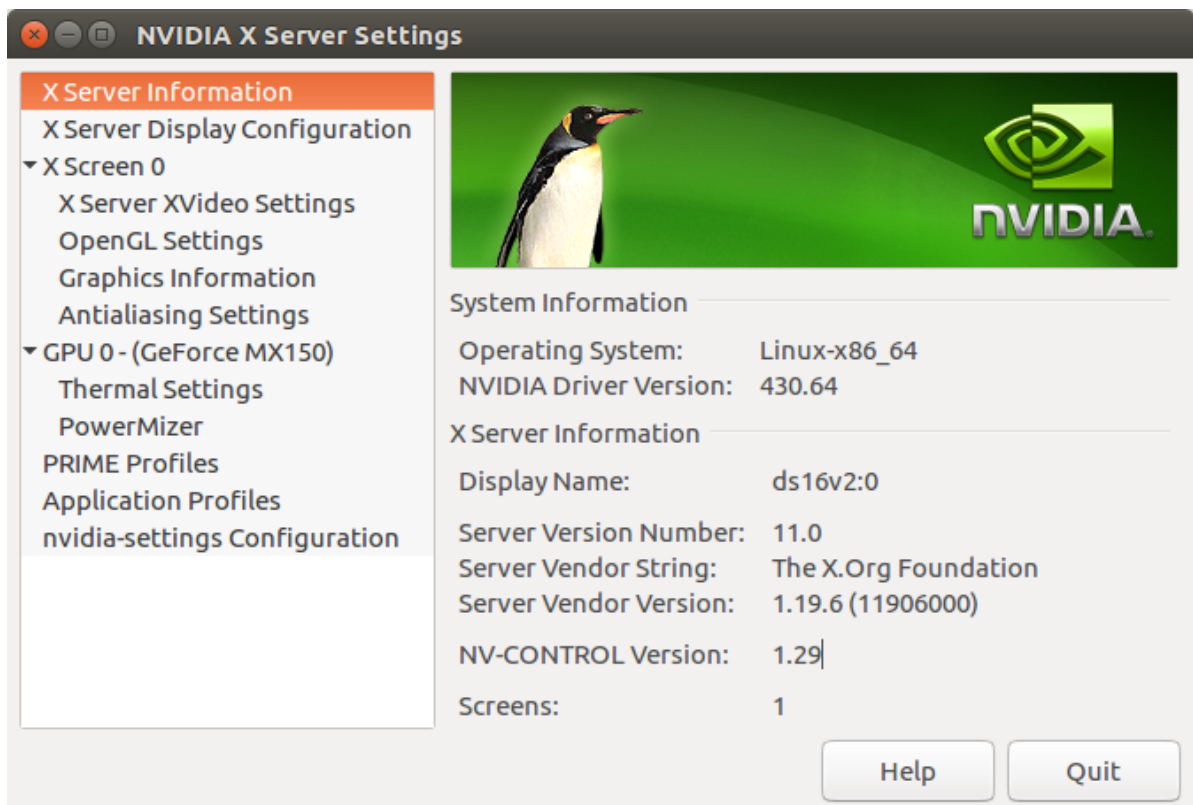
```
ds16v2@ds16v2:~$ nvidia-smi  
Fri Apr 16 21:01:04 2021  
+-----+  
+  
| NVIDIA-SMI 430.64      Driver Version: 430.64      CUDA Version: 10.1  
|  
|-----+-----+-----+  
+  
| GPU   Name           Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC  
|  
| Fan   Temp   Perf    Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute M.  
|  
|=====+=====+=====+  
|    0   GeForce MX150         Off   | 00000000:01:00.0 Off  |             N/A  
|  
| N/A    53C    P0      N/A /  N/A |  201MiB /  2002MiB |         0%      Default  
|  
+-----+-----+-----+  
+
```

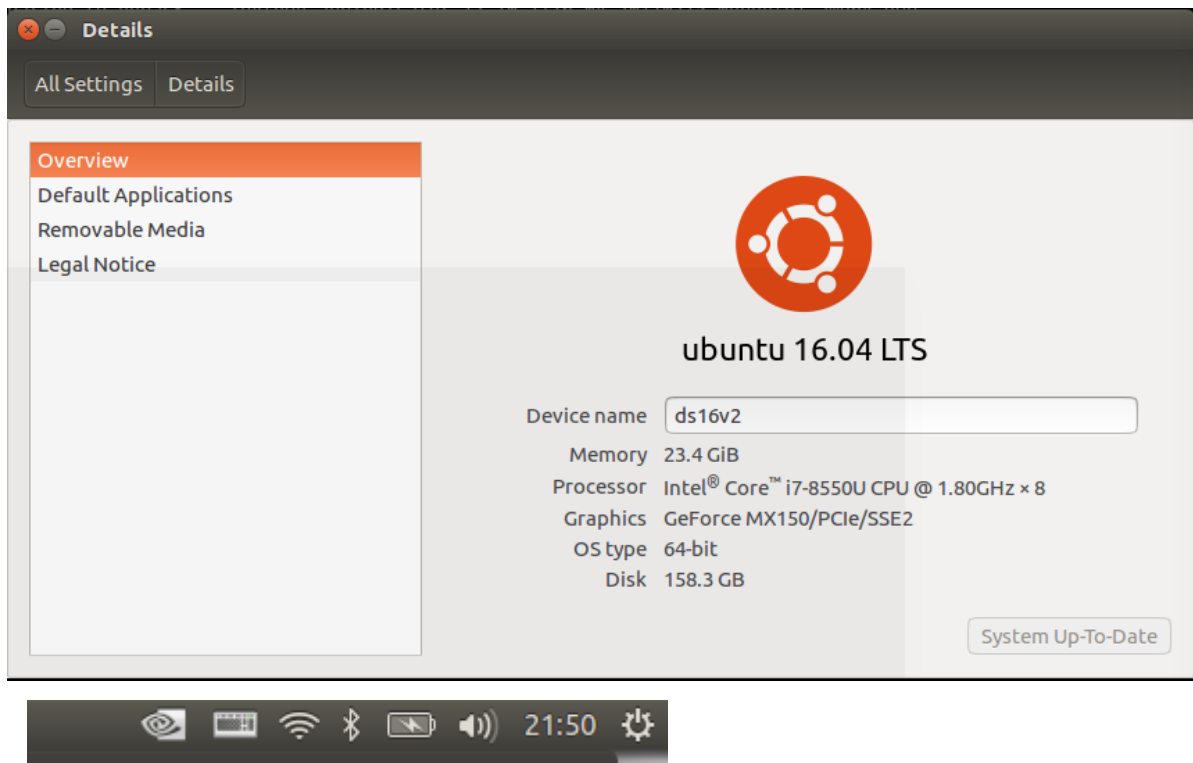
```

+-----+
+
+ | Processes:                                     GPU Memory
+ |
+ | GPU      PID    Type   Process name                      Usage
+ |
+ |=====|
+ |   0      1102    G     /usr/lib/xorg/Xorg                161MiB
+ |
+ |   0      1974    G     compiz                          39MiB
+ |
+-----+
+
ds16v2@ds16v2:~$
ds16v2@ds16v2:~$ nvidia-settings

(nvidia-settings:3832): GLib-GObject-CRITICAL **: g_object_unref: assertion
'G_IS_OBJECT (object)' failed
GPU at BusId 0x1 doesn't have a supported video decoder
** Message: PRIME: Requires offloading
** Message: PRIME: is it supported? yes

```





10. grub name and booting sequence setup (done) (done)

```
#ubuntu 和 windows 启动项名称，顺序修改  
sudo gedit /boot/grub/grub.cfg
```

```
menuentry 'Ubuntu-ds16v2' ...
```

11. ubuntu use screen-cut shortcut (done)(done)

```
link:[Best Tools For Taking and Editing Screenshots in Linux]  
(https://itsfoss.com/take-screenshot-linux/)
```

```
**PrtSc** - *Save a screenshot of the entire screen to the "Pictures" directory.*  
**Shift + PrtSc** - *Save a screenshot of a specific region to Pictures.*  
**Alt + PrtSc** - *Save a screenshot of the current window to Pictures*.  
**Ctrl + PrtSc** - *Copy the screenshot of the entire screen to the clipboard.*  
**Shift + Ctrl + PrtSc** - *Copy the screenshot of a specific region to the  
clipboard.*  
**Ctrl + Alt + PrtSc** - *Copy the screenshot of the current window to the  
clipboard.*
```

12. install typora on linux (done)(done)

link:[Install Typora on Linux](https://support.typora.io/Typora-on-Linux/)

13. update g++ and gcc (done)(not-done)

we have to specify the gcc version to use a new version of gcc or g++ such as using g++-7 or gcc-7

```
...  
ds16v2@ds16v2:~$ gcc --version  
gcc (Ubuntu 5.4.0-6ubuntu1~16.04.12) 5.4.0 20160609  
Copyright (C) 2015 Free Software Foundation, Inc.  
This is free software; see the source for copying conditions. There is NO  
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  
  
ds16v2@ds16v2:~$ gcc-7 --version  
gcc-7 (Ubuntu 7.5.0-3ubuntu1~16.04) 7.5.0  
Copyright (C) 2017 Free Software Foundation, Inc.  
This is free software; see the source for copying conditions. There is NO  
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  
  
ds16v2@ds16v2:~$ g++ --version  
g++ (Ubuntu 5.4.0-6ubuntu1~16.04.12) 5.4.0 20160609  
Copyright (C) 2015 Free Software Foundation, Inc.  
This is free software; see the source for copying conditions. There is NO  
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  
  
ds16v2@ds16v2:~$ g++-7 --version  
g++-7 (Ubuntu 7.5.0-3ubuntu1~16.04) 7.5.0  
Copyright (C) 2017 Free Software Foundation, Inc.  
This is free software; see the source for copying conditions. There is NO  
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  
...
```

14. python virtual environment (done)(done)

why learn this:

1. ROS OS environment has conflict with Anaconda (no anaconda is allowed)

2. try not to damage ubuntu original packed python-2.7 and python-3.5

3. problem appeared

```
root@ds16v2:/usr/bin# pip
Traceback (most recent call last):
  File "/usr/local/bin/pip", line 7, in <module>
    from pip._internal.cli.main import main
  File "/usr/local/lib/python2.7/dist-packages/pip/_internal/cli/main.py",
line 60
    sys.stderr.write(f"ERROR: {exc}")
                                ^
SyntaxError: invalid syntax
root@ds16v2:/usr/bin#
```

4. introduced issue:

```
ds16v2@ds16v2:~$ pip3 install virtualenv
Collecting virtualenv
  Downloading
https://files.pythonhosted.org/packages/91/fb/ca6c071f4231e06a9f0c3bd81c15c23
3bbacd4a7d9dbb7438d95fece8a1e/virtualenv-20.4.3-py2.py3-none-any.whl (7.2MB)
  100% |████████████████████████████████████████| 7.2MB 83kB/s
Collecting filelock<4,>=3.0.0 (from virtualenv)
  Downloading
https://files.pythonhosted.org/packages/93/83/71a2ee6158bb9f39a90c0dea1637f81
d5eef866e188e1971a1b1ab01a35a/filelock-3.0.12-py3-none-any.whl
Collecting six<2,>=1.9.0 (from virtualenv)
  Downloading
https://files.pythonhosted.org/packages/ee/ff/48bde5c0f013094d729fe4b0316ba2a
24774b3ff1c52d924a8a4cb04078a/six-1.15.0-py2.py3-none-any.whl
Collecting importlib-metadata>=0.12; python_version < "3.8" (from virtualenv)
  Downloading
https://files.pythonhosted.org/packages/52/d0/bdb31463f2d9ca111e39b268518e9ba
a3542ef73ca449b711a7b4da69764/importlib_metadata-3.10.1-py3-none-any.whl
Collecting distlib<1,>=0.3.1 (from virtualenv)
  Downloading
https://files.pythonhosted.org/packages/f5/0a/490fa011d699bb5a5f3a0cf57de8223
7f52a6db9d40f33c53b2736c9a1f9/distlib-0.3.1-py2.py3-none-any.whl (335kB)
  100% |████████████████████████████████████████| 337kB 99kB/s
Collecting importlib-resources>=1.0; python_version < "3.7" (from virtualenv)
  Downloading
https://files.pythonhosted.org/packages/f0/5e/69e6a0602c1f18d390952177de64846
8c4a380252858b0022affc3ce7811/importlib_resources-5.1.2-py3-none-any.whl
Collecting appdirs<2,>=1.4.3 (from virtualenv)
  Downloading
https://files.pythonhosted.org/packages/3b/00/2344469e2084fb287c2e0b57b729103
09874c3245463acd6cf5e3db69324/appdirs-1.4.4-py2.py3-none-any.whl
Collecting typing-extensions>=3.6.4; python_version < "3.8" (from importlib-
metadata>=0.12; python_version < "3.8"->virtualenv)
  Downloading
https://files.pythonhosted.org/packages/60/7a/e881b5abb54db0e6e671ab088d079c5
7ce54e8a01a3ca443f561ccadb37e/typing_extensions-3.7.4.3-py3-none-any.whl
Collecting zipp>=0.5 (from importlib-metadata>=0.12; python_version < "3.8"-
>virtualenv)
```

```
Downloading
https://files.pythonhosted.org/packages/0f/8c/715c54e9e34c0c4820f616a913a7de3
337d0cd79074dd1bed4dd840f16ae/zip-3.4.1-py3-none-any.whl
Installing collected packages: filelock, six, typing-extensions, zipp,
importlib-metadata, distlib, importlib-resources, appdirs, virtualenv
Successfully installed appdirs distlib filelock importlib-metadata importlib-
resources six-1.10.0 typing-extensions virtualenv zipp
You are using pip version 8.1.1, however version 21.0.1 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
```

from the issue appeared above, we need have to

first, install `pip/pip3` (no, we did not need to first install 'pip or pip3')

```
You are using pip version 8.1.1, however version 21.0.1 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
```

update for first: there's no need to first install pip/pip3. to create a virtual environment, we can use command either

```
python3 -m pip install --user virtualenv
```

or

to install python env through command

```
ds16v2@ds16v2:~$ sudo apt-get install python3-venv
ds16v2@ds16v2:~$ python3 -m venv /home/ds16v2/PythonEnvs/GroundZeroPy
```

we can use the following command to activate virtual environment:

```
(GroundZeroPy) ds16v2@ds16v2:~$ source
/home/ds16v2/PythonEnvs/GroundZeroPy/bin/activate

# to activate GroundZeroPy environment, you can see that, when
environment
# activated, at the beginning of the console there is a bracket within
indicate
# the current virtual environment used.
```

second, updated `pip/pip3` to higher version (how? goto requirement 6)

solution:

1. enter the virtual environment

```
ds16v2@ds16v2:~$ source
/home/ds16v2/PythonEnvs/GroundZeroPy/bin/activate
```

2. upgrade pip3

(when in virtual environment, python and pip indicate python3 and pip3, because, for my understanding, we use `sudo apt-get install python3-venv` command for installation, that means, if no manually specify python version, by default, python3 will be the virtual environment language and interpreter)

```
(GroundZeroPy) ds16v2@ds16v2:~$ pip install --upgrade pip
Collecting pip
  Downloading
https://files.pythonhosted.org/packages/fe/ef/60d7ba03b5c442309ef42e7d69
959f73aaccdd0d86008362a681c4698e83/pip-21.0.1-py3-none-any.whl (1.5MB)
    100% |████████████████████████████████████████| 1.5MB 859kB/s
Installing collected packages: pip
  Found existing installation: pip 8.1.1
  Uninstalling pip-8.1.1:
    Successfully uninstalled pip-8.1.1
  Successfully installed pip-21.0.1
```

introduced new issue:

```
(GroundZeroPy) ds16v2@ds16v2:~$ pip install numpy
Traceback (most recent call last):
  File "/home/ds16v2/PythonEnvs/GroundZeroPy/bin/pip", line 7, in
<module>
    from pip._internal.cli.main import main
  File "/home/ds16v2/PythonEnvs/GroundZeroPy/lib/python3.5/site-
packages/pip/_internal/cli/main.py", line 60
    sys.stderr.write(f"ERROR: {exc}")
                                ^
SyntaxError: invalid syntax
(GroundZeroPy) ds16v2@ds16v2:~$ pip --version
Traceback (most recent call last):
  File "/home/ds16v2/PythonEnvs/GroundZeroPy/bin/pip", line 7, in
<module>
    from pip._internal.cli.main import main
  File "/home/ds16v2/PythonEnvs/GroundZeroPy/lib/python3.5/site-
packages/pip/_internal/cli/main.py", line 60
    sys.stderr.write(f"ERROR: {exc}")
                                ^
SyntaxError: invalid syntax
(GroundZeroPy) ds16v2@ds16v2:~$ pip3 --version
Traceback (most recent call last):
  File "/home/ds16v2/PythonEnvs/GroundZeroPy/bin/pip3", line 7, in
<module>
    from pip._internal.cli.main import main
  File "/home/ds16v2/PythonEnvs/GroundZeroPy/lib/python3.5/site-
packages/pip/_internal/cli/main.py", line 60
    sys.stderr.write(f"ERROR: {exc}")
                                ^
SyntaxError: invalid syntax
```

solution for this issue reproduce:

```
# 1. create a new virtual environment
ds16v2@ds16v2:~$ python3 -m venv /home/ds16v2/PythonEnvs/GroundFirstPy
```



```

# 2. activate new virtual environment
ds16v2@ds16v2:~$ source
/home/ds16v2/PythonEnvs/GroundFirstPy/bin/activate

# 3. check pip versions (virtual environment is so useful)
(GroundFirstPy) ds16v2@ds16v2:~$ pip --version
pip 8.1.1 from /home/ds16v2/PythonEnvs/GroundFirstPy/lib/python3.5/site-
packages (python 3.5)

# 4. upgrade pip < 21, for python 3.5
(GroundFirstPy) ds16v2@ds16v2:~$ pip install --upgrade "pip < 21.0"
Collecting pip<21.0
  Downloading
https://files.pythonhosted.org/packages/27/79/8a850fe3496446ff0d584327ae
44e7500daf6764ca1a382d2d02789accf7/pip-20.3.4-py2.py3-none-any.whl
(1.5MB)
    100% |████████████████████████████████████████| 1.5MB 89kB/s
Installing collected packages: pip
  Found existing installation: pip 8.1.1
    Uninstalling pip-8.1.1:
      Successfully uninstalled pip-8.1.1
Successfully installed pip-20.3.4
You are using pip version 20.3.4, however version 21.0.1 is available.
You should consider upgrading via the 'pip install --upgrade pip'
command.

# 6. check updated pip
(GroundFirstPy) ds16v2@ds16v2:~$ pip --version
pip 20.3.4 from
/home/ds16v2/PythonEnvs/GroundFirstPy/lib/python3.5/site-packages/pip
(python 3.5)

```

check if workable

```

(GroundFirstPy) ds16v2@ds16v2:~$ pip install numpy
DEPRECATION: Python 3.5 reached the end of its life on September 13th,
2020. Please upgrade your Python as Python 3.5 is no longer maintained.
pip 21.0 will drop support for Python 3.5 in January 2021. pip 21.0 will
remove support for this functionality.
Collecting numpy
  Downloading numpy-1.18.5-cp35-cp35m-manylinux1_x86_64.whl (19.9 MB)
    |████████████████████████████████████████| 19.9 MB 6.4 MB/s
Installing collected packages: numpy
Successfully installed numpy-1.18.5
(GroundFirstPy) ds16v2@ds16v2:~$ pip install matplotlib
DEPRECATION: Python 3.5 reached the end of its life on September 13th,
2020. Please upgrade your Python as Python 3.5 is no longer maintained.
pip 21.0 will drop support for Python 3.5 in January 2021. pip 21.0 will
remove support for this functionality.
Collecting matplotlib
  Downloading matplotlib-3.0.3-cp35-cp35m-manylinux1_x86_64.whl (13.0
MB)
    |████████████████████████████████████████| 13.0 MB 180 kB/s
Collecting python-dateutil>=2.1
  Downloading python_dateutil-2.8.1-py2.py3-none-any.whl (227 kB)

```

```

|████████████████████████████████████████| 227 kB 143 kB/s
Requirement already satisfied: numpy>=1.10.0 in
./PythonEnvs/GroundFirstPy/lib/python3.5/site-packages (from matplotlib)
(1.18.5)
Collecting pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1
  Downloading pyparsing-2.4.7-py2.py3-none-any.whl (67 kB)
|████████████████████████████████████████| 67 kB 195 kB/s
Collecting kiwisolver>=1.0.1
  Downloading kiwisolver-1.1.0-cp35-cp35m-manylinux1_x86_64.whl (90 kB)
|████████████████████████████████████████| 90 kB 196 kB/s
Collecting cyclor>=0.10
  Downloading cyclor-0.10.0-py2.py3-none-any.whl (6.5 kB)
Collecting six
  Using cached six-1.15.0-py2.py3-none-any.whl (10 kB)
Requirement already satisfied: setuptools in
./PythonEnvs/GroundFirstPy/lib/python3.5/site-packages (from
kiwisolver>=1.0.1->matplotlib) (20.7.0)
Installing collected packages: six, python-dateutil, pyparsing,
kiwisolver, cyclor, matplotlib
Successfully installed cyclor-0.10.0 kiwisolver-1.1.0 matplotlib-3.0.3
pyparsing-2.4.7 python-dateutil-2.8.1 six-1.15.0

```

problem solved.

to uninstall pip3 in base environment:

```
root@ds16v2:~# sudo apt-get remove python3-pip
```

for complete virtual environment creating steps using python3-venv, this method could not specify python version in the virtual environment

```

# install python3-venv
ds16v2@ds16v2:~$ sudo apt-get install python3-venv

# create virtual environment
ds16v2@ds16v2:~$ python3 -m venv /home/ds16v2/PythonEnvs/GroundFirstPy

# activate virtual environment
ds16v2@ds16v2:~$ source
/home/ds16v2/PythonEnvs/GroundFirstPy/bin/activate

# check python version
(GroundFirstPy) ds16v2@ds16v2:~$ python --version
Python 3.5.2

# check pip version
(GroundFirstPy) ds16v2@ds16v2:~$ pip --version
pip 20.3.4 from
/home/ds16v2/PythonEnvs/GroundFirstPy/lib/python3.5/site-packages/pip
(python 3.5)

# deactivate virtual environment
(GroundFirstPy) ds16v2@ds16v2:~$ deactivate
ds16v2@ds16v2:~$

```

for differences in using virtualenv and python3-venv, the former can specify python version.

###